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ABSTRACT

The designation "transsexual" refers to those who persistently believe their gender to be incongruous with their anatomical morphology. This study involves a group of 21 female sexual reversal surgery (SRS) candidates and a group of 59 male SRS candidates to observe if transsexual cognitive ability patterns are correlated with levels of stereotypic interest patterns. It was found that the gender stereotypic interest patterns reported by male and female transsexuals were not directly related to cognitive abilities in congruence with psychological gender identity. The MMPI MF scale five, utilized to measure culturally prescribed gender role, was compared to the IQ differential derived from verbal and performance differences scores from an abbreviated WAIS (Wechsler Adult Intelligence Scale). Multiple regression revealed a direct relationship only between educational level and IQ difference scores, but there were indications of an indirect relationship between gender interests and stereotypic cognitive abilities. Female transsexuals had significantly higher performance and full scale IQ scores than male transsexuals in opposition to previously reported cognitive pattern differences between the sexes, and may be a result of gender identity and/or sexual issues. Contains 79 references.
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GENDER STEREOTYPIC INTEREST PATTERNS AS DETERMINANTS OF COGNITIVE ABILITIES IN TRANSSEXUALS

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Abstract

Gender Stereotypic Interest Patterns as Determinants of Cognitive Abilities in Transsexuals

The gender stereotypic interest patterns reported by male and female transsexuals were not directly related to cognitive abilities in congruence with psychological gender identity. The MMPI MF scale 5, utilized to measure culturally prescribed gender role, was compared to the IQ differential derived from verbal and performance difference scores from an abbreviated WAIS. Multiple regression revealed a direct relationship only between educational level and IQ difference scores, but there were indications of an indirect relationship between gender interests and stereotypic cognitive abilities. Female transsexuals had significantly higher performance and full scale IQ scores than male transsexuals in opposition to previously reported cognitive pattern differences between the sexes, and may be a result of gender identity and/or sexual issues.

Chapter 1

Introduction

Cross gender identification is not unique to contemporary society. Rather, there are multifarious examples and descriptions from classical mythology, history and cultural anthropology (Green, 1969). The first biographical account of sex reassignment surgery (SRS) under medical supervision came in 1930 when Einer Wegener, a Danish artist, became Lili Elbe (Money & Gaskin, 1970). But world attention was not profoundly stirred until the highly publicized transformation of Christine Jorgensen in 1951. Since then, there has been a perpetual fascination by the media and the public with high profile contemporary transsexuals such as tennis professional Renee Richards and model and actress Caroline "Tula" Cossey, formerly Barry Cossey. A great deal of curiosity and controversy continues to surround transsexualism both within the lay and scientific communities.

The Transsexual Phenomenon

The term "transsexual" was introduced by D. O. Caldwell in 1949 and later used as a general descriptive term by Harry Benjamin in 1953 (Benjamin, 1969). The designation as "transsexual" refers to those who persistently believe their gender to be incongruous with their anatomical morphology. The DSM-III-R of the American Psychiatric Association (1987)

describes transsexualism as a gender identity disorder following puberty with essential features being a persistent discomfort with a sense of inappropriateness in their assigned sex. This is accompanied by a persistent preoccupation for at least two years with the elimination of their primary and secondary sex characteristics and acquiring the soma of the opposite sex.

Other attempts at understanding and diagnosing gender dysphoric patients have involved typing subgroups of transsexuals according to erotic partner preference, presence or absence of cross gender fetishism, and the nature of gender identity in childhood (Johnson & Hunt, 1990). Person and Ovesey (1974a) suggest a dichotomous system of classifying transsexuals into primary and secondary types. The primary transsexuals have a lifelong gender dysphoria from their earliest recollections: assuming their preferred gender roles and engaging in cross dressing with little regard to social response or ridicule. They also strongly reject homosexuality and are essentially asexual in practice (Person & Ovesey, 1974a). In contrast, secondary transsexualism is thought to develop among homosexuals and transvestites regressively under environmental and psychological stress evolving from failures in previous gender identity adaptations. In general, secondary transsexuals also have lifelong gender identity problems. However, they experience greater

intrapsychic conflict and ambivalence toward these identifications (Person & Ovesey, 1974b).

Blanchard (1989), in an attempt to further delineate and clarify differences in transsexuals, also suggests systematic strategies for descriptive classification of gender identity disorders, specifically calling for classifying small groups as homosexual or nonhomosexual. In larger groupings, further classifications are suggested with nonhomosexuals subdivided as heterosexual, bisexual, and annalloerotic. These taxonomies emphasize the diversity and heterogenicity of transsexualism (Blanchard, 1988).

The primary etiology of transsexualism remains unclear due to the lack of controlled empirical studies and the complexity of the condition (Lothstein, 1983). Numerous factors are variously suggested as contributing to the development of transsexualism. It is most likely that social, cultural, psychological, familial, and biological variables singly, and interactively, have etiological effects on gender dysphoria.

Social and Cultural Factors

Data from transcultural studies seem to support the belief that there are social and cultural differences in transsexuals. The incidence of transsexualism in the United States has been reported as 1:100,000 for males and 1:300,000 for females, while male-female ratios have been estimated from 8 to 1, 4 to 1, or even 1 to 1 (Burnard &

Ross, 1986; McKee, 1976). Interestingly, in Poland recent studies have found these female-to-male ratios of incidence reversed (Godlewski, 1988). Tsoi (1990) reports a series of interviews examining psychosexual development, comparing oriental Singapore transsexuals with Caucasian transsexuals, and revealed marked differences in their sexual drive. For example, Singapore transsexuals report stronger homosexual urges, and an earlier starting sexual drive which was more frequent. They also were less likely to have been involved in heterosexual relationships. This variability of incidence and differences across cultures suggests that cultural nuances at least influence gender dysphoric adaptations and may also play an important role in the development of transsexualism.

Another anomaly indicating cultural-social influence is the under-representation of black female sex change applicants. While there has been an increasing number of individuals identifying themselves as transsexuals, the number of black female sex change applicants has been grossly under-represented. And of those who have presented for SRS, an inordinate number have been found to have severe psychotic disorders including schizophrenia (Lothstein & Roback, 1984). The authors suggest that cultural determinants may preclude severe gender identity pathology except as a consequence of severe psychosis, and further

emphasized the need for research into the impact of cultural dynamics which influence transsexualism.

Motivation for the female mid-life sex change applicant also seems to be linked to social and cultural influences. Roback and Lothstein (1986) reviewed clinical information from 13 female transsexuals 40 years of age or older and compared them to a younger female transsexual control group. They found that the mid-life transsexual's sex change desire followed threatened loss of a relationship or was linked to the memories of a previously experienced loss of a relationship. That is, separation and abandonment were major issues for mid-life female transsexuals and appeared influential in their seeking a sex change at that life stage.

Psychological and Familial Factors

Stoller (1967), a psychoanalytical theorist, has proposed one of the most in-depth psychological theories of the development of male transsexuals. The focus of this theory is on the parent-child relationship as the source of an individual's gender core identity. The transsexual male is thought to be the product of a family configuration having a domineering, devouring mother, with somewhat bisexual tendencies, who gives birth to a "beautiful boy," to whom she becomes consummately attached. The mother's physical invasiveness includes constant holding and sleeping with the child. The father is described as physically

and/or psychologically absent and impotent to intervene. The intensity of this symbiosis between the mother and son becomes so great that the child is unable to differentiate and establish a male gender identity core. Therefore, the son identifies with the mother while imitating her feminine behavior. Stoller (1968) in essence believed that the etiology of transsexualism was rooted in family dynamics.

Psychodynamic theories of transsexualism mainly viewed the phenomenon as a psychological disturbance or perversion related to preoedipal issues. These theories have focused primarily on male issues of development, ranging from bonding and rupture in the mother-child relationship during the separation-individuation period, to oedipal conflicts and castration anxiety. Most analysts also perceive transsexualism as a defense against underlying homosexual and bisexual conflicts (Lothstein, 1983).

Theories of the development of female transsexuals have come later and been more scarce than those of the male counterparts (Lothstein, 1983). One such theory was devised by Volkan and Bhatti (1973), who studied dream reports of male and female transsexuals awaiting SRS and identified several themes of the female transsexuals' developmental psychology. Their family configuration is described as having a father physically or emotionally absent, and a mother who has been sexually hungry and depressed. From these circumstances the daughter has accordingly developed

intense rescue fantasies. These fantasies are that she might save the mother only if she herself were a male. The child then begins placing objects between her legs (i.e., plastic bottle, Q-tip), and these are precursors to the penis she desires. These objects also link her to the mother-like childhood fetishes to help deal with her separation anxiety. Furthermore, these objects, as a symbolic penis, serve to separate the girl from the depressed mother who lacks a penis. When the child reaches the oedipal age, she desires to escape the troubled but intense relationship with her mother's representation by seeking love and acceptance from the father. But the father fails to fulfill these expectations, and she consoles herself by identifying with him, thereby changing the meaning of her phallic object. It is then unconsciously experienced as the father's phallus. Ultimately, the child relinquishes her representative phallic object but then demands that a phallus be surgically constructed.

Additional theorists have cited various psychological and familial influences affecting gender identity development. Halle, Schmidt, and Meyer (1980) reported that one-third of their male transsexual subjects were from families reared by maternal grandmothers who had encouraged cross dressing. Lothstein (1979) theorized that for female transsexuals there is a constant communicative assault by the parents against the daughter's femininity, thereby

distorting and destroying the child's sense of self and gender. While these examples show variations of theories from divergent psychological perspectives, most have a common motif promulgating family pathology as the prominent influence in the development of the transsexual.

Several case studies involving transsexual siblings have provided significant evidence supporting child rearing and familial patterns as important psychological determinants of transsexualism. Stoller and Baker (1973) reported the incidence of two fraternal transsexuals. Both males were viewed by the mother as "beautiful children" at birth and through infancy, and both sons maintained a symbiotic relationship with their mother. The father was absent from the home much of the time, leaving the children without a masculine role model.

Another case of three male siblings who fit Stoller's description for male transsexualism is discussed by Sabalis, Frances, Appenzeller, and Moseley (1974). In this case the mother maintained an intrusively close physical relationship with the children, while the father was excessively absent from the home. The parents endured an unhappy marriage until the death of the father, at which time the mother quickly remarried. The new husband was more effeminate, passive and submissive, and also spent extensive time away from the home.

A third case of two male transsexual triplets also follows much of Stoller's criteria for the development of male transsexualism (McKee, Roback, & Hollender, 1976). The children received little parenting for the first three years of their lives but then were raised in a close relationship with their foster mother. There is little knowledge of the foster father's role in the child rearing. Later an aunt became an important influence in the brothers' lives, but the uncle was absent, again leaving the children void of a masculine role model. This physical absence and/or emotional unavailability of a male role model is commonly reported in male transsexual family histories.

Joyce and Ding (1985) reported the first case of two sisters with transsexualism. Because the incidence of transsexualism in females is so rare, the occurrence of two sisters being transsexual is extremely low. Therefore this phenomenon further supports familial factors as having etiological significance. The sisters have a four-year age difference and have a younger brother with apparently normal psychosexual development. Both sisters described their relationship with their parents as caring and supportive, but noted a tendency for the mother to be slightly more dominant. The authors made no conclusions about etiology, although they did explore the possibility of the younger sister modeling after the older, but concluded that in this case it was improbable. While these examples corroborate

with familial and psychological theories concerning transsexuals, they are not conclusive and they also infer possible biological genetic factors.

Biological Factors

Genetic abnormality has been related to the development of transsexualism in a study where an inordinate number of males with chromosomal abnormalities, including Klinefelter's syndrome (47, XXY configuration), also appeared to be transsexual (Money & Pollitt, 1964). However, these findings were not considered to be statistically significant, and the authors caution that these results may have been confounded by sampling bias. Subsequently, it was only proposed that chromosomal abnormalities may create a vulnerability for deviancies in psychosexual development.

Attention has also been given to possible hormonal influence of gender identity and sexual behavior. Studies using animals and human subjects indicate that prenatal exposure to hormones postnatally affects sexual behaviors (Ellis & Ames, 1987; Hamburg & Lunde, 1966). Analogous studies have revealed that female fetuses that have been overly exposed to androgen became less interested in doll play than control subjects, and participated more in rough play. Conversely, male fetuses of diabetic mothers were exposed to estrogen to prevent miscarriage and subsequently

were found to be significantly less aggressive and athletic during early childhood (Money & Ehrhardt, 1972).

Hormonal output involved in conditioning the hypothalamus of the brain is also vital for all aspects of sex to be normal. The output of testosterone as early as six weeks conditions the hypothalamus to respond properly to testosterone in later life. Without this prenatal conditioning, sex will not be completely normal for the male even when given supplemental testosterone postnatally. Failure of this conditioning may influence behavior and gender identity.

Rivaling the psychodynamic theories of the development of transsexualism is a theory proposed by John Money (1988), who incorporated the influence of prenatal hormonal effects and their interaction with postnatal psychodynamics. Prenatal hormonalization of the brain is described as predisposing, rather than predestinating an individual toward a dominant gender identity. A proclivity ratio on a continuum between masculinization and feminization is hormonally influenced to cultivate the mind toward heterosexuality, homosexuality, or an equal ratio tending toward bisexuality. This hormonal predisposition is described to later interact with postnatal psychodynamics and family influences and thus determining gender identity. For example, children whose prenatal neurologic hormonalization gives them a proclivity toward

heterosexuality; this predisposition later interacts with strong postnatal influences toward homosexuality, which in turn may produce bisexual potential or similar deviations. Again, a child with a hormonal developmental tendency toward heterosexuality, later receives postnatal heterosexual reinforcement, would develop as a normal heterosexual. Money (1988) propagates the significance of interaction between the influence of prenatal hormonal development and postnatal psychodynamic influence which becomes the propelling force in sexual identity and behavior.

Further studies examining the structure of the hypothalamus have reported a difference between the brains of homosexuals and heterosexuals. Morphometric analysis of the hypothalamus revealed that the volume of the suprachiasmatic nucleus in homosexual men was significantly larger and contained more cells than that of the reference group (Swaab & Hofman, 1990).

More recently interstitial nuclei of the anterior hypothalamus (INAH) in homosexual males, a region thought to govern sexual behavior, was found to have the anatomical form usually found in women rather than that of heterosexual men (LeVay, 1991). This correlation emphasizes the possibility that the structure of the brain plays an important role in sexual identity along with influencing cognitive and behavioral gender differences. The author acknowledges that the study needs to be replicated due to

its intricacies and subjective influences. In general these recent biological findings present evidence for a biological predisposition to sexual preference and possible identity which later may interact with psychological events and traumas to develop specific sexual behavior.

Research on Psychopathology in Transsexuals

Early psychiatric thinking was that all sex change applicants were apriori psychotic (Meerloo, 1967). This conviction has been tempered by empirical studies revealing a diversity of psychopathology in gender patients including character pathology, neurosis, and blatant psychosis. Finney, Brandsma, Tondow, and Lemaistre (1975), using a Minnesota Multiphasic Personality Inventory (MMPI) computerized psychodiagnostic assessment of 20 SRS candidates, found their most prevalent feature to be that of hysterical personality (i.e., overuse of defenses of repression, denial, dissociation and/or conversion). These defenses were thought to account for the typical transsexual history in which they deny any memory of considering themselves anything but their psychologically perceived gender.

Levine (1980), in an evaluation by clinical interview of 51 gender dysphoric patients, found that 84% (92% males; 58% females) had a psychiatric diagnosis apart from gender dysphoria. In addition these patients completed a battery of psychological tests including the MMPI, elements of the

WAIS, the Sentence Completion Test (SCT), the Bender Gestalt, and the Draw-a-person test. These results confirmed the clinical diagnosis in 53% and also indicated a more severe disturbance involving character pathology in the vast majority of the remainder of the patients.

Contrary to these findings, other research has failed to detect serious psychopathology in the MMPI profiles of SRS candidates (Roback, McKee, Webb, Abramowitz, & Abramowitz, 1976). This finding should be viewed cautiously as the MMPI was utilized as the single psychometric adjustment measure.

Additionally, female-to-male transsexuals are generally seen as psychologically healthier than the male-to-female (Hunt, Carr, & Hampson, 1981), while also having better psychosocial adjustment (Kockott & Fahrner, 1988). Kuiper and Cohen-Kettenis (1988) used structured interviews to measure psychosocial adjustment with 36 female and 105 male transsexuals in the Netherlands. They report that the female-to-males are accepted more readily by their families than the male-to-females. Males postoperatively also reported having more difficulty coping with issues of their past life as a male.

MMPI profiles of biological males have been reported to have significant elevations (beyond a T score of 70) on the Masculinity-Femininity scale (MF) and the Psychopathic Deviant (PD) scale (Hunt et al., 1981). When profiles were

scored on the basis of female norms, the MF scores dropped to 50. By comparison, the biological females had less extreme elevations on either the Masculinity-Feminity scale or the Psychopathic Deviant scale and did not show a similar drop in MF when scored on norms congruent with gender identity. Finney et al. (1975), using MMPI analyzed data with 19 male transsexuals, reported elevations on the Hysteria (HS) subscale. Schizoid and paranoid trends were also noted, and the authors concluded that the patients, apart from their transsexualism, were not all psychotic but they were not without psychopathology.

Studies on transsexual psychopathology have been divided. Those studies using more than one personality instrument along with clinical interviews indicate a presence of psychopathology. The pathology is usually reported as characterological disturbance in most transsexuals.

Gender Differences in Cognitive Abilities

Animal studies with laboratory rats have shown better male than female performance on spatial tasks such as mazes (Beatty, 1984). It has also been found that perinatal exposure to sex hormones in rats influences spatial ability. This sex disparity in rats can be manipulated by either perinatal castration of males or administration of androgens to females (Beatty, 1984).

Gender differences on perceptual-motor testing among humans has also been reported. Wechsler (1958) reported consistently small but important sex differences as males achieved higher scores on performance scales, while females were better on verbal proficiency scales. One of the most well-known reviews on psychological gender differences was provided by Maccoby and Jacklin (1974). They concluded that there were three cognitive gender differences that were "well-established," stating that females have superior verbal ability, while males have greater mathematical and visual-spatial skills. In addition, Fennema and Carpenter (1981) published a report in the National Assessment of Educational Progress showing that there were gender differences in high school students, and that males out-performed females, particularly in higher level cognitive tasks such as problem solving. Further studies involving spatial ability revealed a male advantage due to differences in item solution skills (Kyllonen, Lohman, & Snow, 1984).

Later studies using meta-analysis have indicated that verbal gender differences may be present but are very small (Hyde, 1981). Hyde and Linn (1988) further examined 165 studies that were conducted after 1973 that reported a significance test for gender differences in verbal ability. Their findings argued that gender differences in verbal ability were insignificant and that previous verbal differences that were present prior to 1974 are no longer

evident. One interpretation offered for this change was that there may have been an increase in male performance abilities and/or a decrease in female verbal abilities, and that these changes may have occurred due to an increased flexibility in gender roles and activities. Another interpretation could be that these male advantages never existed. The authors also pointed out the possibility of a past trend where studies finding insignificant effects of gender differences were not published and may have skewed the reported data (Hyde & Linn, 1988).

Sex differences in spatial ability remain distinct using certain tasks. Linn and Peterson (1985), using meta-analysis to summarize studies examining sex differences in spatial abilities, have corroborated their existence. They concluded that spatial perception is easier for males than females and that large sex differences are found only on measures of mental rotation, but that medium differences are apparent for spatial perception tasks, and small differences are detected in spatial visualization tasks. Visualization and spatial performance depends greatly on meta-strategies, the selection and efficient application of solution strategies, and the flexibility to allow change in strategies. The spatial ability gender differences may have been the result of the females' propensity to utilize inefficient task strategies or that they may not have acquired appropriate strategies for these tasks.

Coinciding with the data involving spatial ability, sex differences in mathematical performance still exist. These differences, though diminished, remain in favor of males (Hyde, Fennema, & Lamon, 1990). Again using meta-analysis studies on mathematics performance conclude that the male advantage is small but remains. The lower performance of females in problem solving was most evident in high school. These cognitive gender differences that have been found may largely be attributed to socio-cultural factors and stereotypes which influence motivation and opportunity for the sexes. This is especially evident as many of these differences have diminished in recent studies.

Cognitive Abilities of Divergent Groups

While the magnitude of cognitive gender differences remains a topic of debate, studies have attempted to determine if differences in cognitive abilities hold true for divergent groups. Money (1963) found that cognitive patterns of individuals with Turner's syndrome (a chromosomal defect) were found to have significantly higher verbal IQ scores than performance IQ scores on the WAIS. These same individuals were also found to have significantly higher verbal comprehension than perceptual organization using factorial scores from subsets of the WAIS subtests. Money and Alexander (1966) attained corroborating results using Turner's syndrome patients and found deficiencies in

space form perception and in areas dealing with numbers using a Mental Abilities test.

Tangential research has looked at cognitive profiles of homosexual men as compared to heterosexual men and women using visual-spatial and verbal scales of the WAIS (McCormick & Witelson, 1991). The pattern of cognitive abilities of the group of 38 homosexual males was more similar to those of the heterosexual females than that of heterosexual men on verbal fluency and visual-spatial tasks. That is, the visual-spatial abilities of heterosexual men were significantly higher than those of homosexual men. Willmott and Brierly (1984), using prorated WAIS verbal and performance IQ scores, also found that their group of 20 homosexual men scored lower than heterosexual men and more similar to women on performance scales; the verbal scale of homosexual men was significantly higher than that of heterosexual men and the heterosexual women.

Intellectual profiles of male transsexuals indicate higher than average intelligence (Doorbar, 1969). It has also been found on the Wechsler Adult Intelligence Scale that biologic male transsexuals perform in a typically male pattern, scoring higher on performance over verbal tasks (Loomis, 1977). Hunt et al. (1981), using both biological male and female transsexuals, also reported that on the WAIS transsexuals performed in congruence with their biologic sex rather than their gender identity. The authors compared the

verbal and performance IQ differential but note that they were unable to make any definitive comparisons because of the small number of biological females in the sample.

Summary

Multiple factors, in various combinations, seem to play a role in the etiology of transsexualism. These factors include psychological, neuro-hormonal and social-cultural influences. It is of great importance that we understand to a greater degree the differences and similarities in those seeking sexual reversal surgery in order to treat them more effectively. While sex reassignment may be helpful to some patients, others with distinctive differences and pathologies may be better served with psychotherapy (Barlow, Abel, & Blanchard, 1979), pharmacotherapy, family and/or group therapy. Attempts have been made to distinguish various transsexual subtypes. These typologies are determined according to sexual preference, presence or absence of gender fetishism, and age of onset. Much important work examining the psychopathology and development of these individuals has been done, but there has been a lack of focusing on the broader issues such as cognitive style, functioning, and thought processes of transsexuals (Lothstein, 1984).

Few studies have investigated cognitive differences within this population due to the rarity of the disorder, and moreover its even lower incidence in females. Most of

the cognitive research has focused on comparisons between normal males and male transsexuals, or between male and female transsexuals, leaving a void in cognitive comparisons within the transsexual groups.

Since the consensus of literature describes transsexuals as a heterogenous group, it should also be important to examine cognitive differences within these groups to see if these variances distinguish subtypes and further determine objective commonalities. Research has shown that there are distinguishable cognitive differences between genders. These may largely be due to socio-cultural factors and stereotypic bias which in turn influence an individual's educational and vocational motivation and opportunity (Hyde & Linn, 1988).

Individual patterns of sexual expression are tied in with patterns of cognitive structure and the choice of occupation in the stereotypes of scientists and artists (Beardslea & O'Dowd, 1962). These same stereotypes have accurately reflected differences in cognitive ability and sexual identity (Hudson, 1967, 1970). Also, sexual behaviors and preferences have been shown to co-vary with individual differences in cognitive ability patterns (Willmott & Brierly, 1984). Sattler (1988) additionally lists factors influencing intellectual functioning such as heritability, familial environment, ethnic background, social experience and gender influences.

When examining a group such as transsexuals, like other gender dysphoric groups they are characterized by stereotypic behavior, exaggerated sex-typed interests and overcompensated gender behavior (Brierly, 1979). It is suggested that since cognitive styles and patterns are bound to personality factors and interests (Sattler, 1988; Wechsler, 1950), transsexuals, who display exaggerated stereotypic interests and behavior, will co-vary in level with a stereotypic cognitive ability patterns.

The present study involves a group of female SRS candidates and a group of male SRS candidates to observe if transsexual cognitive ability patterns are correlated with levels of stereotypic interest patterns.

Hypotheses

1. Male transsexuals with higher levels of female stereotypic interest patterns will reveal greater stereotypic cognitive ability patterns, in congruence with their female gender identity.

2. Female transsexuals with higher levels of male stereotypic interest patterns will reveal greater stereotypic cognitive ability patterns, in congruence with their male gender identity.

Chapter 2

Method

Subjects

The Vanderbilt University Hospital, Department of Psychological Services, conducts psychological evaluations for male and female transsexuals applying for sexual reassignment surgery. In consultation with the clinical psychologist, the archival data from the files of 97 SRS applicants were reviewed. Profiles of individuals evaluated between 1972 and 1981 were utilized, as this was the most prolific period using the same psychometric instruments for evaluation at Vanderbilt University Hospital. There were 72 male and 25 female transsexual files reviewed. Missing data from the Wechsler Adult Intelligence Scale and/or the MMPI excluded 13 male and 4 female files from the study. All of the subjects were preoperative. The treatment of the data was in accordance with the ethical standards of the American Psychological Association.

Apparatus

The subjects were evaluated using a psychological battery including the Wechsler Adult Intelligence Scale (Wechsler, 1955), abbreviated form. The verbal subtests included the information and similarities scales, which both have their highest factor loadings on the verbal comprehension factor (Cohen 1957), while the performance

subtests included digit symbol and block design, which have their highest factor loadings on the perceptual organizational factor (Cohen, 1957; Sattler, 1988). The abbreviated form full scale IQ (FIQ) correlation coefficient to the WAIS full scale is .954. The correlation between the WAIS abbreviated verbal IQ (VIQ) and the WAIS verbal scale is .936, and the correlation between the WAIS abbreviated performance IQ (PIQ) and the WAIS performance scale is .917 (Matarazzo, 1972) The Minnesota Multiphasic Personality Inventory, Form R was also given from which the MF scale 5 T-scores will be utilized which measures gender stereotypic interest patterns and identification with a culturally prescribed role (Greene, 1980).

Procedure

Each of the subjects was administered an abbreviated version of the WAIS as an intellectual screening. The scale scores were totaled and prorated to find the estimated (VIQ) and (PIQ) scores. The subjects also completed the first 400 items of the MMPI in order to score the clinical scales. The predictor variable, T scores from scale 5 MF, were recorded. A multiple regression procedure was used to compare the predictor variable of scale 5 MF scores to the relative difference between the verbal and performance scores (IQdiff). Education was controlled using it as an additional predictor variable in the multiple regression equation.

Chapter 3

Results

There was a significant correlation (using simple regression) between the MF scale and IQdiff; however when the education variable was added to the multiple regression equation, the significant variance was attributed solely to education (see Table 1). Additional regression analyses revealed a significant relationship between the MF scores of MTs and education (Beta = .30, T = 2.30, p = .03), implying an indirect relationship to IQdiff. Contrary to expectation, Hypothesis 1, stating male transsexuals (MTs) with higher levels of female interest patterns would reveal greater stereotypic feminine cognitive ability patterns, was not directly supported.

Hypothesis 2, stating female transsexuals (FTs) with higher levels of male interest patterns would reveal greater stereotypic masculine cognitive ability patterns, also was not supported. Further, the FT IQdiff scores did not co-vary with MF scores or educational level.

The 59 MT cognitive profiles were almost evenly distributed; 32 had greater performance than verbal IQ scores and 27 had greater verbal than performance scores. Verbal, Performance and Full scale mean IQs of MTs were essentially equal to a normative mean of 100 (see Table 2).

Table 1

Regression Predictors of Male IQdiff Scores

	Simple Regression		
	Beta	T	p
MF	.27	2.09	.041
Education	.30	2.29	.025
	Multiple Regression		
MF	.17	1.27	.209
Education	.32	2.44	.018

$F = 5.15$; $p = .009$

Table 2

Transsexual Mean IQ Scores

	MTs[a]			
	VIQ	PIQ	FIQ	IQdiff
M	99.50	101.25	100.30	-1.74
SD	17.89	12.87	15.05	14.40
	FTs[b]			
M	107.52	113.95	110.90	-6.43
SD	15.52	12.04	13.28	14.21

[a] n = 59

[b] n = 21

The WAIS profiles from 14 of the 21 FTs had higher performance than verbal IQ scores. The FTs' mean verbal IQ score of 107.52 was in the average range of functioning, but the performance (113.95) and full scale (110.90) IQs were in the high average range (see Table 2). As a group, FTs displayed the hypothesized more masculine cognitive pattern with a greater mean PIQ than VIQ score. Post hoc statistical analyses using Bonferroni's T-test (Keppel, 1982) revealed statistically significant differences between male and female transsexuals' PIQ scores and also FIQ scores (see Table 3).

The MTs' mean MF T-score was much higher than what would be generally expected for male respondents measuring three and one-half standard deviations above the mean (see Table 4). Only four, or 7% of MTs' profiles, had MF scores less than two standard deviations above the mean, and all four of these scores were more than one standard deviation above the normative mean.

The FTs' mean MF score was also much higher than what was expected for normal females measuring approximately two standard deviations above the normative mean (see Table 4). The range of the MF scores was 28 for the FTs and 44 for MTs.

There does appear to be at least an indirect relationship between MTs' interest patterns and IQdiff

Table 3

Bonferroni's T-test Between MT and FT IQ Scores

	MTs	FTs	t
VIQ	99.50	107.52	-1.95
PIQ	101.25	113.95	-4.07*
FIQ	100.30	110.90	-3.03*

*p <.01.

Table 4

Mean Scores of Predictor Variables

	MTs	
	MF	EDUC
M	85.35	12.14
SD	9.64	2.44
n	59	56
	FTs	
M	69.33	13.40
SD	6.99	2.13
n	21	20

Note. Educational level for 3 MTs and 1 FT was missing from the data.

scores. The data further support the idea of FTs having greater performance abilities than the MTs.

Chapter 4

Discussion

The purpose of this study was to determine if stereotypic gender interest patterns could predict stereotypic gender cognitive patterns in transsexuals. The level of gender stereotypic interest patterns in male and female transsexuals was not predictive of gender stereotypic cognitive abilities when controlling for education. This suggests that gender interests do not directly influence stereotypic cognitive patterns. However, there was a significant relationship between the male transsexuals' MMPI MF scale and education which implies the possible indirect effect of feminine gender interests on IQdiff. The relationship between feminine gender interest patterns to education may be a driving force motivating MTs to higher levels of education, which may in turn increase IQ and IQ differential scores in favor of verbal abilities.

Elevated scores on the MMPI MF scale have previously been associated with higher education and broader vocational interests in males (Greene, 1980). Additionally Maccoby and Jacklin (1974) found college males to be more feminine in their interests than the general population. Hunt et al., (1981) when finding transsexual samples to have higher mean IQ scores than the standardized mean, hypothesized that transsexuals were more likely to be brought up in

androgynous homes created by parents with higher IQs. But the directional effect of androgyny may be a compelling or an interactional force influencing educational level. The causal relationship between masculine-feminine interests and education remains unclear, but there is the possibility that interests may be influencing educational level and thereby influencing cognitive patterns.

Though a direct relationship between masculine-feminine interest patterns and IQdiff scores was not found in the present study, this does not preclude other influences of personality on transsexual cognitive patterns. Cloninger (1987) reports a possible genetic transmission of personality traits such as novelty seeking, harm avoidance, and reward dependence. These personality variants may impede or encourage educational pursuits. Byne and Parsons (1993) theorize that personality traits influence the way in which an individual and the environment interact. Personality traits, whether inherited or developed, may influence educational drive, cognitive ability, and sexual orientation (Byne & Parsons, 1993).

Transsexual IQ Score Comparisons

The 21 FTs had a mean verbal IQ score in the average range, but a high average mean on both performance and full scale IQs. Hunt et al. (1981) also found female transsexuals to have higher than average Full scale IQ scores on the WAIS. This same group had a mean verbal-

performance IQ differential slightly in favor of verbal abilities. But these observations are limited by a small sample size of only five subjects and a mean IQ difference of only four points. The present study with 21 subjects may be more representative showing FTs as having greater visual-spatial abilities than verbal abilities. These visual-spatial strengths may be related to the performance-related stereotypic interests and vocations (e.g., sports, construction, engineering, etc.) pursued by a large portion of FTs seeking sex change.

The cognitive data from the FTs compared to the cognitive data of male homosexuals may also imply a link between cognitive patterns and sexual orientation. The pattern of cognitive skills of homosexual men has been reported as being different from heterosexual men (McCormick & Witelson, 1991; Willmott & Brierly, 1984), and similar to female controls (Willmott & Brierly, 1984). These studies reported homosexual males as having higher verbal fluency relative to visual-spatial ability and concluded that cognitive ability is associated with sexual orientation. In comparison, FTs have been described as being almost exclusively homosexual (Kockett & Fahrner, 1988; Pauly, 1974), while MTs exhibit more diverse sexual behavior including being: asexual, homosexual, bisexual, or heterosexual (Blanchard, 1989). The finding of higher performance than verbal ability in FTs, though opposite from

male homosexual cognitive patterns, may be due to similar processes involving cognitive ability and sexual orientation, and is worthy of further study.

When compared to normative mean scores of the WAIS, MTs had approximately average verbal, performance, and full scale IQ scores. Previous studies have reported above average intelligence for MTs (Doorbar, 1969; Hunt et al., 1981; Tsoi, Kok, & Long, 1977). The most significantly higher IQ levels, found by Doorbar (1969), have been attributed to the idea that intelligent transsexuals are more likely to seek sex reassignment.

Other studies reporting MTs with higher FIQ scores vary only slightly from the standardized mean and remain in the average range (Hunt et al., 1981; Loomis, 1977). The present study using a sample of 59 MTs found the mean IQ score essentially equivalent to the standardized normative mean and appears to be a representative sample.

The relationship between education and the verbal-performance difference scores is in agreement with cognitive data collected on the Wechsler Adult Intelligence Scale Revised (WAIS-R) (Matarrazo & Herman, 1985; Sattler, 1988). These data reveal greater verbal performance differences in favor of verbal abilities as IQ magnitudes increase. The relationship between education and greater verbal than performance IQ differences is also supported by the propositional theory of education. This theory views

traditional education as being dominated by left hemisphere training in areas of speaking, writing, and verbally related tasks (Springer & Deutsch, 1989). Traditional training is therefore thought to create a verbal bias.

Higher education is associated with higher IQ which in turn is related to a higher IQ differential favoring verbal abilities (Sattler, 1988). It is notable that while MTs seem to follow this pattern FTs do not, in spite of their slightly higher mean educational level. MTs' IQdiff scores are significantly related to educational level; FTs again do not reveal this same relationship. FTs had significantly higher educational level and FIQ than MTs but their mean IQ differential was in favor of PIQ rather than VIQ. These dissimilar scores in performance and visual-spatial ability between male and female transsexuals contrast reports of the opposite trend in normal male and female samples (Linn & Peterson, 1985). This suggests a possible link between cognitive abilities and issues such as gender identity, gender interests, or sexual orientation. These issues warrant further attention in future research.

Transsexual MF Score Comparisons

Mean scores on the MF scale for MTs are similar to previous studies which also report mean MF scores at least three standard deviations above the MMPI normative mean (Finney et al., 1975; Leavitt & Berger, 1990). High-scoring males, at least two standard deviations above the normative

mean, are described as being inner-directed with aesthetic interests and not identifying with the traditional masculine role (Greene, 1980). These higher scores also imply femininity of emotional interest and possible homosexual interest (Leavitt & Berger, 1990). Since the transsexuals in this study were seeking sexual reassignment surgery, they were likely determined to prove their femininity. Since many of the items on the MF scale have a high face validity, it is possible that MTs try to prove their femininity by acknowledging items in a more feminine direction and thereby decreasing the variance in the scale. This may indicate a need for using more subtle scales to measure masculine and feminine characteristics.

The mean MF score for FTs was approximately two standard deviations from the MMPI normative mean. This level of the FTs' mean MF is in accordance with previously reported levels (Roback et al., 1976), and also in agreement with the less extreme scores of MF when compared to MTs (Hunt et al., 1981). Women obtaining MF scores two standard deviations from the mean may be described as experiencing social difficulties related to a behavioral deviation from a conventional sex role (Greene, 1980) which accurately describes the FTs.

Methodology and Research Recommendations

The present study has been limited by the quasiexperimental design. But the scarcity of the

transsexual phenomenon limits access to the population and promotes the improvisional use of archival data to increase subject numbers. The lack of a control group hinders more exact comparisons, but the normative data from well-established psychometric instruments were utilized.

The examination of cognitive data in substantial groups of FTs remains virtually absent from the literature. The differences in female transsexual PIQ and VIQ scores indicate a need for further study and comparisons to other FT and MT groups. Cognitive comparisons within the transsexual group, divided by sexual preference, should also be explored. Furthermore, in light of the apparent differences found in cognitive patterns between male and female transsexuals, and the differences in sexual orientation between these groups, it is suggested that cognitive comparisons be made with male and female homosexual groups.

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